cessful in the majority of the patients. However, small residual shunts detectable by TEE are common.

954-137 An Analysis of the Outcome of Umbrella Closure of Patent Ductus Arteriosus in Children

M.H. El Habbal, W. Muniweera, J.F.N. Taylor. *Cardiac Unit, Great Ormond Street Hospital For Children NHS Trust, London, UK*

Recently, the management of catheter closure of patent ductus arteriosus (PDA) was changed from using umbrella device to coils. This change was based on the relative complexity and cost of the umbrella device. In the period from 1990 to 1996, 115 patients underwent catheter closure of PDA using umbrella device (130 devices). Their ages were 8 months to 18 years (median 4 years) and weights 8–51 kg (median 15 kg). All patients underwent cardiac catheterisation and angiography before and after implantation of the device/s. All were admitted to hospital; echocardiographic and doppler examinations were performed within 24 hours. In 3 cases, an initial attempt to implant coils failed and an umbrella device was used. Residual leakage was present in 34 cases (30%). This resolved spontaneously within 6–14 month in 26 cases. Re-intervention was required in 8 cases (7%); a second umbrella device was implanted in 6 cases and coils in 2 cases (6 coils were used). The complications were haemolysis due to significant leakage (1), mild narrowing of left pulmonary artery from a large device (2), embolisation of a small device into the right pulmonary artery requiring surgical retrieval (1), broken device (1), small device which was replaced by a larger one (6) and external bleeding (2). These complications occurred during our early experience. All patients (except one) were discharged 24–36 hours after admission. To date, no late complications have been encountered. *Conclusion:* The use of umbrella device can achieve 99% complete closure of patent ductus arteriosus by 14 months. Failure of coils to close large PDA warrants the use of umbrella device. Coils may be used for successful closure of residual shunts.

954-138 Outcome of Stent Implantation into the Arterial Duct in Cyanotic Neonates

E. Rosenthal, S.A. Qureshi, E.J. Baker, M. Tynan. *Paediatric Cardiology, Guy's Hospital, London, UK*

Stent implantation into the arterial duct (ST-AD) may avoid systemic to pulmonary artery shunt operations in neonates with duct-dependent cyanotic heart disease.

We have attempted ST-AD using 4–6 mm diameter Tower single strand retrievable stents 1.2–1.6 cm in length in 13 neonates and 1 infant (ages 2–46 days and weights 2.6–4.2 kg). Pulmonary atresia (PAt) was present in 8, severe subpulmonary stenosis in 5 and critical pulmonary stenosis (PS) in 1. In 4 patients (pts), balloon dilation (BD) of the pulmonary valve was performed (2 after radiofrequency valvotomy for PAt & IVS, 1 critical PS, 1 TOF).

It was not possible to place a guidewire across the tortuous duct in 4 pts: 3 of them proceeded to a modified Blalock-Taussig shunt and 1 had BD of the pulmonary outflow tract. 4 stents were malpositioned initially and 1 embolised into the pulmonary artery: these were snared, removed and replaced more accurately. 2 patients, in whom the aortic orifice of the duct had not been stented, remained duct dependent and required further stents at a second procedure. Aspirin and Warfarin were continued after the procedure.

1 pt died suddenly at 24 hours in ventricular fibrillation cause unknown and 1 pt died at 8 weeks from inadequate pulmonary blood flow. 2 pts required Blalock-Taussig shunts at 1 & 6 weeks. 2 pts with complex PAt had central pulmonary artery reconstruction at 12 & 16 months. 1 pt had complete TOF repair at 4 months. In 2 pts who were no longer duct dependent (1 critical PS and 1 with PAt & IVS) the stents occluded uneventfully at 9 and 25 months after Warfarin was discontinued. 1 pt with PAt & IVS is still duct dependent.

Stent implantation into the arterial duct is an alternative to neonatal systemic to pulmonary artery shunt operations. In some all surgery can be avoided; in others, subsequent surgery can be performed in the absence of a thoracotomy or pulmonary artery distortion.

954-139 Immediate Change in Right Ventricular End Diastolic Pressure After Pulmonary Valvuloplasty

W.B. Drake, T.P. Doyle, G.A. Moreau, T.P. Graham. *Vanderbilt University Medical Center, Nashville, TN, USA*

It is well known that percutaneous pulmonary balloon valvuloplasty results in an immediate decrease in peak right ventricular systolic pressure in patients with congenital valvar pulmonary stenosis. An immediate decrease in right ventricular end-diastolic pressure has been observed post-pulmonary valvuloplasty in some patients. This study retrospectively reviewed 56 patients who had pulmonary valvuloplasty performed in 58 procedures. In 21 of the 58 procedures, right ventriculograms were performed before and after valvuloplasty, giving additional volume data. Patients with volume data did not significantly differ from the total group in age at catheterization, severity of obstruction or improvement in gradient. As expected, differences were seen pre- and post-valvuloplasty in peak RV systolic pressure (mean pre = 98 mm Hg; mean post = 55 mm Hg; $P < 0.05$) and pulmonary valve gradient (mean pre = 74 mm Hg; mean post = 30 mm Hg; $P < 0.05$). A decrease in right-ventricular end-diastolic pressure was also seen (mean pre = 11.4 mm Hg; mean post = 10.0 mm Hg; $P < 0.05$) post-valvuloplasty. Additionally, an increase in angiographic ejection fraction was observed in the volume group (mean pre = 57.5%; mean post = 65.5%; $P < 0.05$). A significant difference was also seen in right ventricular end-systolic volume after valvuloplasty (mean pre = 14.4 mL/m^2; mean post 11.6 mL/m^2; $P < 0.05$) but not in right ventricular end-diastolic volume (mean pre = 35.7 mL/m^2; mean post = 33.6 mL/m^2; $P = 0.21$). In summary, there appears to be a small but significant immediate decrease in right ventricular end-diastolic pressure post pulmonary valvuloplasty which cannot be explained by changes in end-diastolic volume. This would suggest that changes in right ventricular distensibility can be an acute active process which may be dependent on ventricular afterload.

954-140 Pulmonary Balloon Valvuloplasty Induced Acute Changes in Right Coronary Blood Flow Velocity Pattern

I.E. Kallikazaros, C.G. Stratos, C.P. Tsioufis, C.I. Stefanadis, S.A. Marakas, P.K. Toutouzas. *Department of Cardiology, University of Athens, Greece*

The impact of the elevated right ventricular systolic pressure (RVSP) and its changes on the right coronary artery (RCA) blood flow have not been well studied in humans. In 7 patients with severe isolated pulmonary valve stenosis (mean age 28.6 ± 16.1 years), proximal RCA blood flow velocity (BFV) was measured, using an intracoronary Doppler velocimeter, along with hemodynamic parameters before and after pulmonary balloon valvuloplasty (PBV). The pre-valvuloplasty phasic RCA BFV pattern was predominantly diastolic with an obvious systolic retrograde wave. RVSP had a negative correlation with the peak systolic antegrade BFV and the systolic antegrade BFV curve area ($r = -0.690$, $r = -0.454$, respectively) and a positive correlation with the peak systolic retrograde BFV, the systolic retrograde BFV curve area and the peak diastolic BFV ($r = 0.986$, $r = 0.722$, $r = 0.560$, respectively). PBV caused a significant reduction in both the transvalvular pressure gradient ($p = 0.002$) and the RVSP ($p = 0.004$). The peak systolic antegrade BFV and the systolic antegrade BFV curve area increased significantly ($p = 0.023$, $p = 0.048$, respectively). The peak systolic retrograde BFV and the systolic retrograde BFV curve area decreased significantly ($p = 0.019$, $p = 0.038$, respectively). RVSP changes were negatively correlated with the changes in the peak systolic antegrade BFV and the systolic antegrade BFV curve area ($r = -0.743$, $r = -0.924$, respectively) and positively correlated with the changes in the peak systolic retrograde BFV, the systolic retrograde BFV curve area, the peak diastolic BFV and the diastolic BFV curve area ($r = 0.942$, $r = 0.805$, $r = 0.722$, $r = 0.392$, respectively). RCA BFV pattern is strongly dependent on the RVSP level and its changes after PBV. PBV-induced reduction in RVSP results in improvement of the RCA BFV pattern.

954-141 Critical Pulmonary Valve Stenosis in the Neonate: Initial Results & Followup Using an Umbilical Artery Snare Assisted Approach

H.S. Weber, G. Wizar. *Penn State University Childrens Hospital, Hershey, PA, USA*

Neonatal critical pulmonary valve stenosis (PS) is rare and these infants present with cyanosis secondary to inadequate antegrade pulmonary blood flow & right to left atrial shunting. Balloon valvuloplasty (BV) is effective although technically difficult with variable results, multiple balloons are usually necessary (gradational approach) and fluoroscopy exposure can be extensive. Since 1989, 13 neonates with critical PS (age: 3 ± 2 days; wt: 3.4 ± 0:5 kg) presented with cyanosis requiring PGE1. The first 3 neonates underwent gradational BV & in the subsequent 10, BV was performed using a transductal snare assisted umbilical artery approach to simplify the procedure (5 mm goose neck snare via a 4 F umbilical artery catheter). Initial echo demonstrated severe tricuspid valve insufficiency (100%), RV dilation/reduced function (79%), RV hypoplasia (21%), pulmonary valve gradient (57 ± 18 mmHg), estimated RV pressure (92 ± 20 mmHg) & pulmonary valve annulus dimension (8.3 ± 1.4 mm). Post valvuloplasty there was a significant decrease in RV pressure (92 ± 18 vs 49 ± 9 mmHg, $p < 0.001$) & RV/Aorta pressure ratio (1.5 ± 0.2 vs 0.8 ± 0.1, $p < 0.001$). The number of balloons utilized (3.3 ± 2.1 vs 1.2 ± 0.4, $p < 0.01$) & fluoroscopy time (95 ± 5 vs 33 ± 14 minutes, $p < 0.01$) was reduced using the snare approach. PGE1 was discontinued in all patients 3 ± 5 days post valvuloplasty without